

A NEW SPECIES OF *PALAEEMONETES*  
(CRUSTACEA: DECAPODA: PALAEMONIDAE)  
FROM NORTHEASTERN MEXICO

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*Abstract.*—*Palaemonetes hobbsi* is described from the headwaters of the Río Mante near Ciudad Mante in the state of Tamaulipas, México. While this new species is similar to *Palaemonetes mexicanus* Strenth from the nearby state of San Luis Potosí, it differs with respect to rostral dentition, first maxilliped morphology, and spination of the appendix masculina. It also exhibits a disjunct nonoverlapping range. Standard starch gel electrophoretic comparisons also confirm that this new taxon exhibits biochemical differences that are distinct from *P. mexicanus*.

*Resúmen.*—Se describe una nueva especie de *Palaemonetes* de agua dulce de México: Esta especie de camarón ocurre en las aguas de cabecera del Río Mante y Río Frío cerca de Ciudad Mante en el estado de Tamaulipas. Es similar a *Palaemonetes mexicanus* Strenth conocida del estado de San Luis Potosí. Se distingue esta especie nueva de la especie *P. mexicanus* por las diferencias en la dentición del rostro, en la morfología del primer maxilípido, en la disposición de las espinas del appendix masculina, y el análisis de bioquímica.

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Following a review (Strenth 1976) of the North American species of freshwater *Palaemonetes* Heller, continued field work in northeastern Mexico revealed the presence of several populations of shrimp from two large springs near Ciudad Mante in the state of Tamaulipas. It was apparent from collections made during 1980 and 1983 that these populations differed morphologically only slightly from specimens of *P. mexicanus* Strenth from San Luis Potosí. Field work was continued in Mexico during the middle and late 1980's to establish the range of *P. mexicanus* as well as the Ciudad Mante populations. It was during this time that Hobbs & Hobbs (1989) reported the presence of these shrimp as a range extension of *P. mexicanus*. Subsequent field work now appears to support the conclusion that these populations are in fact quite distinct and separate in their distribution from that of *P. mexicanus*.

This undescribed taxon is restricted to the springfed headwaters of the Río Mante and Río Frío. More importantly, this aquatic decapod inhabits the headwaters of a separate and independent drainage system from that of *Palaemonetes kadiakensis* Rathbun or *P. mexicanus* which are also known from northern Mexico (Strenth 1976). The Río Mante and Río Frío flow into the Río Guayalejo which is a part of the Río Tamesí system. *Palaemonetes kadiakensis* is not known to occur south of the Río Bravo del Norte (Río Grande) drainage system and the distribution of *P. mexicanus* is restricted to the headwaters of a small stream which flows into the Río Tampaón which is a part of the Río Pánuco drainage system to the south in the states of San Luis Potosí and Veracruz. Extensive downstream collections from the type locality of *P. mexicanus* have failed to produce specimens from either the Río Tamuin or the Río Pánuco.

Similar downstream collections from the Río Mante and Río Frío conducted in the Río Guayalejo and Río Tamesí have likewise failed to yield specimens of freshwater *Palaemonetes*.

Recent laboratory analyses confirm that the Río Mante population exhibits biochemical differences that are distinct from *P. mexicanus*. It is now evident that this population represents a currently undescribed taxon. This conclusion is based upon morphological differences, restricted distribution, and the absence of overlapping ranges of this form with any other currently known species of *Palaemonetes*.

#### Materials and Methods

Specimens selected for biochemical analysis were immediately frozen in liquid nitrogen in the field and returned to the laboratory. Abdominal tissue samples of 20 specimens collected from the headwaters of the Río Mante were biochemically compared with similar tissue samples of 20 specimens of *P. mexicanus* from the type-locality west of Ciudad Valles in San Luis Potosí. These samples were subjected to electrophoretic analysis using standard horizontal starch gel techniques (Selander et al. 1971, Murphy et al. 1990). Four of 11 isozyme systems examined were observed to exhibit significant variation between the two populations. Specimens which were preserved in alcohol upon collection are deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C. (USNM) and the Instituto de Biología de la Universidad Nacional Autónoma de México, Mexico City (EM).

#### *Palaemonetes hobbsi*, new species Fig. 1

*Palaemonetes mexicanus* Strenth, 1976.—  
Hobbs & Hobbs, 1989:222.

*Type material*.—Nacimiento del Río Mante, 8 km southwest of Ciudad Mante,

Tamaulipas, México, 20 May 1980, coll. N. E. Strenth. Male holotype, USNM 264749; one male, one gravid female, paratypes, USNM 264748; one male, one gravid female, paratypes, EM 11972.

*Description*.—Rostrum (Fig. 1a) high; upturned at end; extending to near anterior margin of scaphocerite; dorsal margin with 5 to 6 teeth, one of which is placed behind the orbit; ventral margin with 2 teeth. Antennal spine sharp, distinct; overreaching anterior margin of carapace. Branchiostegal spine sharp and distinct; situated on anterior margin of carapace just below branchiostegal groove.

Abdomen normal; pleura of third somite rounded; pleurae of fourth and fifth somites angular; sixth somite 1.5 times as long as fifth. Telson (Fig. 1b) equal in length to sixth somite; anterior pair of dorsal spines located  $\frac{1}{3}$  of telson length from posterior margin; posterior pair on or near posterior margin. Posterior margin of telson with sharp median point flanked by 2 pair of spines and 1 pair of plumose setae; lateral pair of spines short, failing to reach median point of telson; mesial pair of spines elongate extending 3 to 4 times length of lateral spines.

Eyes (Fig. 1a) well developed; cornea globular and well pigmented. Stylocerite (Fig. 1e) sharp and extending  $\frac{1}{3}$  length of basal segment of antennular peduncle; anterolateral spine sharp, extending to anterior margin of segment; lateral antennular flagellum with rami fused for 13 to 22 articles; free portion of shorter ramus consisting of 3 to 7 articles. Scaphocerite (Fig. 1d) almost 3 times as long as wide, lateral margin slightly concave, blade extending well past lateral tooth.

Mouthparts (Figs. 1f–k) typical for the genus. First maxilliped (Fig. 1i) with endopod; epipod nonbifurcate. First pereopod (Fig. 1l) extending to distal margin of third segment of antennular peduncle; dactyl and propodus without teeth, bearing numerous setae distally; carpus twice as long as chela, 1.2 times as long as merus. Second pereopod

(Fig. 1m) extending to anterior margin of scaphocerite; dactyl and propodus without teeth, bearing few setae distally; carpus 1.4 times as long as chela; merus and chela equal in length. Third pereopod (Fig. 1n) extending to base of third segment of antennular peduncle; propodus 1.8 times as long as carpus; merus 1.9 times as long as carpus. Fourth pereopod extending to anterior margin of second segment of antennular peduncle; fifth pereopod extending to near anterior margin of scaphocerite.

Appendix masculina (Fig. 1c) of male with 4 apical spines which extend to distal margin of endopod; appendix interna  $\frac{1}{2}$  length of appendix masculina. Eggs of gravid females 1.2–1.5 mm in length. Lateral ramus of uropod with or without movable spine between fixed distolateral tooth and margin of blade.

*Size.*—Males with carapace lengths to 6 mm (including rostrum, to 11 mm); females, to 7 mm (including rostrum, to 12 mm).

*Variation.*—The movable exopod spine on the lateral ramus of the uropod is quite variable; both movable spines may be present, both may be absent, or only a left or right one may be present. No specimens were observed to exhibit a subapical tooth on the ventral margin of the rostrum.

*Color.*—Living specimens are transparent. The eggs of gravid females are dark green in coloration.

*Range.*—This species is currently known only from the headwaters of the Río Mante and Río Frío near Ciudad Mante in the state of Tamaulipas, México.

*Etymology.*—This species is named in honor of Dr. Horton H. Hobbs, Jr. of the Smithsonian Institution in Washington D.C., and Dr. Horton H. Hobbs III of Wittenberg University, Springfield, Ohio.

*Remarks.*—*Palaemonetes hobbsi* shares characteristics with *P. mexicanus* as well as with *Palaemonetes texanus* Strenth from the southwestern United States. All three species are similar in the variation of movable

exopod spination of the uropods. *Palaemonetes hobbsi* is similar to *P. mexicanus* with respect to the number of fused articles of the lateral antennular flagellum. *Palaemonetes hobbsi* ranges from 13–22 fused articles while *P. mexicanus* ranges from 14–24. *Palaemonetes texanus* differs somewhat in exhibiting 19–29 fused articles. *Palaemonetes hobbsi* is similar to *P. texanus* in that both species exhibit angular pleurae of the fourth and fifth somites. The first maxilliped of *P. hobbsi* is similar to *P. texanus* in exhibiting an endopod; this same structure is also similar to *P. mexicanus* in possessing a non-bifurcated epipod. This intermediacy of characters is possibly related to the fact that the distribution of *P. hobbsi* lies between the distributions of both *P. mexicanus* and *P. texanus*. All three species appear to be closely related.

*Palaemonetes hobbsi* differs, however, from both *P. mexicanus* and *P. texanus* with respect to rostral dentition and spination of the appendices masculinae. *Palaemonetes hobbsi* exhibits only five or six dorsal rostral teeth while *P. mexicanus* exhibits six or seven and *P. texanus* ranges from five to eight. *Palaemonetes hobbsi* exhibits four apical setae on the appendix masculina while *P. mexicanus* and *P. texanus* exhibit five and six apical spines respectively. In addition, there is virtually no significant difference in the size of adult male and female specimens of *P. hobbsi*. Female specimens exhibit carapace lengths that are less than 10% longer than male specimens. Female specimens of both *P. mexicanus* and *P. texanus* are considerably larger and exhibit carapace lengths that are 28 to 45% longer than their male counterparts.

In addition to the above anatomical differences, preliminary electrophoretic analyses of both *P. mexicanus* and *P. hobbsi* reveal differences in the isozyme production of malate dehydrogenase 1, malate dehydrogenase 2, phosphoglucosmutase and a-glycerophosphate dehydrogenase. These differences are considered significant in light



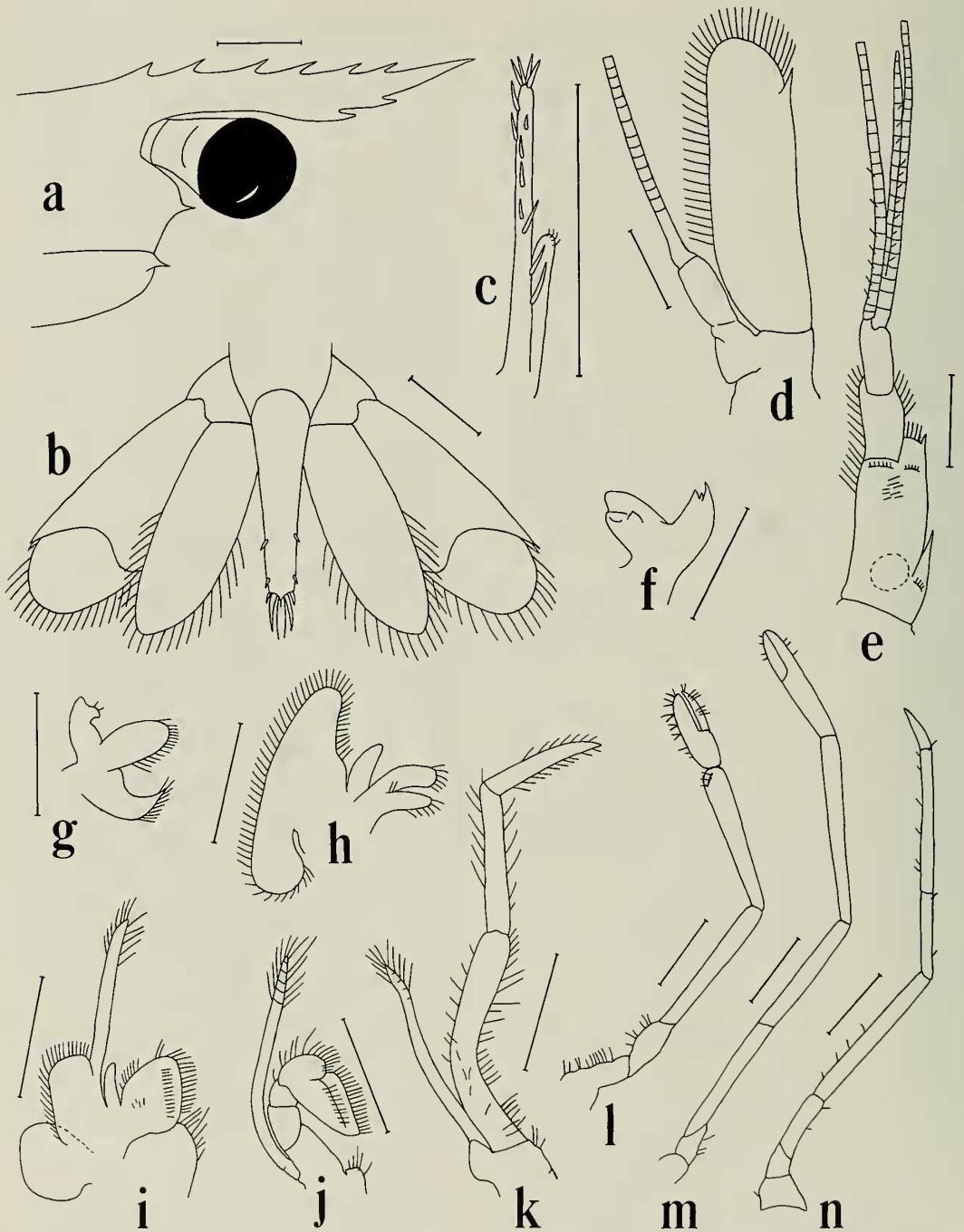


Fig. 1. *Palaemonetes hobbsi*, new species, holotype, male: a, anterior region; b, telson and uropods; c, appendix masculina; d, first antenna; e, second antenna; f, mandible; g, first maxilla; h, second maxilla; i, first maxilliped; j, second maxilliped; k, third maxilliped; l, first pereopod; m, second pereopod; n, third pereopod. (Scales = 1.0 mm).

of the fact that palaemonids are known to exhibit low levels of allozyme variation (Boulton & Knott 1984). While the exact nature of the above biochemical variation is under current investigation, it is interpreted here only as additional supportive evidence of the premise that *P. hobbsi* represents a taxon which is morphologically distinct and geographically separate from *P. mexicanus*.

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